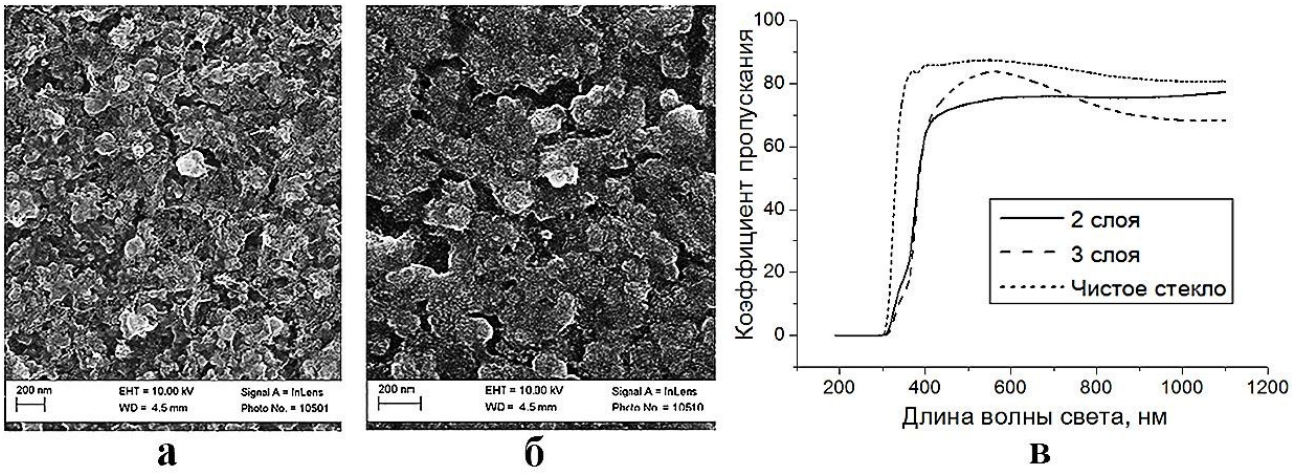

Рис. 1. СЭМ-изображение двухслойного наноструктурированного покрытия на основе ZnO, осажденного из раствора $Zn(CH_3COO)_2$: а) – нижний образец, б) – верхний образец; в) – спектры оптического пропускания исследуемых образцов.

Измерение удельного сопротивления показало, что наилучшей проводимостью обладают образцы, служившие основой для прилипания (~ 0.2 ГОм/см^2).

Обсуждаются вопросы, связанные с изучением наблюдаемых интерференционных явлений, особенностей электронной структуры покрытий, а так же вопросы, связанные с определением оптимальных условий синтеза.

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STUDY OF THE DEPENDENCE OF VELOCITY VOLUME DEPOSITION ON NI-NANOTUBES CHANGE ON THE POROSITY OF THE TEMPLATE

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Nanostructured materials are of great scientific interest due to their unique physical properties (mechanical, optical, electromagnetic) compared to the macrostructured materials of the same chemical composition. The study of these properties is one of the priorities of modern science in order to create new nanostructures and successful application for practical purposes in the future. All specific properties of such structures are caused by quantum phenomena and size effects. Quantum-size effect is related to the changes in the system's properties due to the presence of at least one dimension comparable with the wavelength of electron, characteristic to this system [1-3].

In this paper, track membranes based on polyethylene terephthalate (PET) type Hostaphan® manufactured by «Mitsubishi Polyester Film» (Germany) were used for

the template synthesis of metallic nanostructures based on Ni by electrochemical deposition from electrolyte solutions. Pore density is 4.0E + 07, thickness 12 microns and a range of diameters 180-300 nm. PET films were irradiated in an DC-60 accelerator by krypton ions with energy 1.75 MeV/nucleon. Template synthesis in the tracks of the membrane was carried out at a constant voltage of 1.5 V. Electrolyte solution: $NiSO_4 \times 6H_2O$ (100,14 g/L), H_3BO_3 (45 g/L), $C_6H_8O_6$ (1,5 g/L).

Bulk deposition rate for the same applied voltage is constant and does not depend on the diameter. There is an evidence of a direct correlation of the increase of deposition time and the porosity of the template: the higher the porosity, the longer the time it requires to fill pores, whereas volume velocity remains constant.

When the diameter of the pore of template matrix increases the thickness of the tube wall increases. Change in the thickness of the tube can affect the magnetic properties of the nanostructures. With the reduction of the wall thickness magnetic domains become more ordered. Using defined volumetric deposition rate constant we can calculate the time necessary for depositing template matrix with particular porosity, which allows to control the deposition process.

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ВЫБОР ТЕХНОЛОГИЧЕСКИХ ПАРАМЕТРОВ ДЛЯ СИНТЕЗА КУБИЧЕСКОГО НИТРИДА АЛЮМИНИЯ

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SELECTION OF TECHNOLOGICAL PARAMETERS FOR SYNTHESIS OF CUBIC ALUMINUM NITRIDE

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The technological parameters of cubic aluminum nitride synthesis were studied. The effects of particle size, reaction temperature, reaction time on the synthesis of cubic AlN and the reaction mechanisms were analyzed. The basic methods of synthesis were classified and conditions determined. It is found that formation of metastable cubic phase is connected with supersaturation conditions.

Нитрид алюминия обладает свойствами, которые делают его применение перспективным в различных отраслях, таких как полупроводниковая промышленность, производство теплопроводящих материалов, производство керамиче-